

Ed Hazzard

I like the diagram (Energy Sketch.pdf). It shows the importance of pictures (not just words) to represent the "blocks" within which the energy transformations happen.

Attached are some images of diagrams I've been think about, and experiments with existing software -- not to use, just to reflect on (see notes below). It's an interesting challenge to make them both qualitatively clear and quantitatively complete if one wishes. Note the number of decisions (and knowledge) required in each diagram. And I could easily imagine another author coming up with a very different diagram than mine for the same situation.

Questions:

- What is a list of situations for which we want to make diagrams?
- Do we want to include both energy flow and material flow? (I think yes.)

Specs (just a start):

- Both material flow and energy flow can be represented
- Two elements: blocks (transformations) and arrows (transport)
- Transformations happen within the blocks, not in the arrows
- Arrows can be labeled
- Blocks can be shown as images
- Blocks can be "opened up" to see and edit what's happening inside
- There can be blocks within blocks
- Blocks can have several arrows either arriving or leaving
- Inputs and outputs (each associated with an arrow) are clearly displayed and can be quantitative as well as qualitative
- Quantitative features can be added to qualitative diagrams
- Diagrams must have collapsible (right word?) parts so that details can be added without overwhelming the clarity of the diagram, or parts of the diagram can be pulled out for more detailed development
- Quantitative features must deal with units
- Pop-up notes can be added to any unit
- Student commentary is part of the diagram, not somewhere else
- There needs to be a standard "heat sink" icon that can show energy loss to the environment along the way, including loss "from" the arrows
- Some form of assessment is integrated into the diagramming process

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attached images:

bulb heat - quantitative.jpg Even a simple thing like a light bulb can produce a big diagram with lots of notes.

water cycle.jpg An example of using a diagram for material flow, which is a big piece in the standards

bike - with notes.png An experimental diagramming of the bike ride using Inspirations, to see how it feels and looks.

light bulb model 1- STELLA.pdf An experimental diagramming of a light bulb using Stella, again to see how it feel and looks.

seeMap ex.png Just a sample from seeMap. Is there anything in this that's a useful model?

energy flow - plants and animals.jpg Another example of what might come up in life science